AN ANNOTATED LIST OF VASCULAR PLANTS FROM CAPE SABINE, ALASKA

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INTRODUCTION

While making field studies of *Campanula* (Campanulaceae) in western North America during the summer of 1959, Mr. Karl Stone and I had an opportunity to spend several days (July 11-14) in the vicinity of Cape Sabine, a small cape on the Arctic Coast of northwest Alaska (ca. 68° 55′ N. lat., 164° 30′ W. long.). At this cape, located about 65 km. east of Cape Lisburne, the westernmost land-point of the Arctic Slope, the Pitmegea River enters the Arctic Ocean. This small river flows off the North Slope of the Brooks Range, and its drainage basin lies, physiographically, very near the western limits of the Arctic Slope as defined by Spetzman (Fig. 4).

The Arctic Slope of Alaska was rather poorly collected prior to 1941 when Hultén's monumental Flora of Alaska and Yukon began appearing, and the many large gaps on his range maps have undoubtedly been responsible in part for stimulating the intensive floristic research conducted in Arctic Alaska in recent years. Many new areas have been visited and collected with the result that a reasonably accurate picture of distribution patterns on the Arctic Slope is emerging. No small part of the stimulus for this research has come from the Arctic Research Laboratory at Point Barrow. Through its facilities field work that hitherto was impossible has become routine. Now, virtually no spot on the Arctic Slope is inaccessible. The floristic research of the last two decades was summarized in 1962 in the much-needed volume by Wiggins and Thomas, A Flora of the Alaskan Arctic Slope. What is at once evident from this work is that despite all the collecting on the Arctic Slope in recent years many areas still remain relatively unknown. Collections from certain areas, such as Cape Lisburne and Point Barrow, are very extensive and must be virtually complete, whereas many other areas have been little collected. Continuing pub-

lication of floristic contributions from the Arctic Slope of Alaska seems, therefore, amply justified.

Cape Sabine is not far from Cape Lisburne, but it has been passed over by many collecting parties for the more alluring Cape Lisburne. From a phytogeographic standpoint, however, Cape Sabine should be interesting, because this general area combines physiographically features of both the coastal plain and the foothills of the Brooks Range (cf. Spetzman). Although several previous parties have made recent collections in this area, their results have not been made known and their records have not, regrettably, been reported by Wiggins and Thomas. I think it worthwhile, therefore, to bring our collection to the attention of other arctic botanists, despite its incompleteness. In the very short time available to us, the equivalent perhaps of two full days of collecting, we were able to collect 143 species. This number surely must represent at least half and possibly as much as two-thirds of the local vascular flora (cf. Spetzman, p. 52). Even so, one new record for North America and several new ones for the Arctic Slope were established (cf. later discussion). Publication of this list was first suggested by Dr. Henry Childs, my camping partner, at that time working under the direction of Dr. Frank Pitelka, University of California, studying mammal populations in the Pitmegea valley as a part of a longterm ecological study supported by the Arctic Institute of North America. Dr. Childs felt that they very much needed specific information on the vegetation of the Pitmegea valley for their study.

EXPLANATORY NOTES

We collected at two locations in the Pitmegea valley. Mr. Karl Stone, with a camping partner, collected in the immediate vicinity of the Cape, while I collected inland about 11 km. (7 mi). Henceforth, the two sites will be called the "Coastal" and "Sevenmile" sites, respectively. Few if any vascular plant collections have been made previously at Sevenmile. All numbers given in the catalog, following the Latin names and synonyms, are joint Shetler-Stone collection numbers. Those in italics represent Coastal collections, while

all others are Sevenmile collections. An asterisk (*) following a number indicates a unicate collection. The first and only complete set of specimens is deposited at the University of Michigan Herbarium. Partial sets can be found at the following institutions: Arctic Research Laboratory (Point Barrow), Komarov Botanical Institute (Leningrad), National Museum of Canada (Ottawa), Riksmuseum (Stockholm), U. S. National Museum, and the University of Alaska.

The genera are arranged as in Hultén's Flora of Alaska and Yukon, and the species are arranged alphabetically. Certain critical groups were sent to A. E. Porsild (Nat. Mus. Canada), who kindly determined or verified their identities for me. He is credited accordingly in the catalog. All determinations not otherwise credited were made by me. In June 1962, after the collections had all been determined, E. Hultén kindly looked at our specimens while examining all arctic collections at the University of Michigan, and his opinions have been duly incorporated and credited in the catalog. Unless otherwise noted, he concurred with my determinations.

Hultén's Flora of Alaska and Yukon has served as the point of reference throughout, and all unmodified page citations to Hultén are to this work. Where I have used a name other than that used by him, I have given his name in parenthesis. Few other synonyms are given. A wide range of publications was consulted, including the Flora of the USSR, and where for compelling reasons I have departed from Hultén's interpretations the appropriate citations and explanatory notes are given. Insofar as our material permitted, I have attempted to indicate, by Latin epithets or critical comment, the nature of the infraspecific variation exhibited.

I regret that Wiggins' and Thomas' flora appeared too late for me to consider it in the original preparation of this paper. In a cursory way, however, I have checked my manuscript against their nomenclature, descriptions, and records, and wherever possible I have taken their point of view into consideration.

PHYTOGEOGRAPHICAL COMMENTS

The Cape Sabine region is really in the foothills of the Brooks Range (cf. Spetzman, fig. 4), and, as already noted,

physiographically this area has certain features of both the foothills and the coastal plain. There are many low ridges and domes which give the terrain the gently rolling aspect of the lower foothills, but the extensive flat meadows, some very poorly drained, and numerous small lakes in the Sevenmile area suggest typical coastal plain. Certainly the climate is more coastal than montane, because of the proximity of the sea, although the amount of relief is atypical for coastal plain. Between the Cape and Sevenmile the land rises from sea level to nearly 350 m. This is a rather sharp rise for a distance of only about 11 km. Thus, more habitats than are typical for coastal plain are afforded in this area, and the flora might be expected to be more diverse than at other coastal stations eastward.

The following list of 16 species collected by us which are rare or unknown on the Arctic Coast of Alaska suggests a strong montane element in the Cape Sabine flora: *Bromus inermis pumpellianus, Carex atrofusca, C. lugens, Juncus albescens, Luzula wahlenbergii, Anemone narcissiflora, Smelowskia calycina, Chrysosplenium wrightii, Saxifraga davurica, S. eschscholtzii, Potentilla biflora, P. ledebouriana, Primula tschuktschorum, Pedicularis oederi, Senecio hyperborealis, Taraxacum phymatocarpum.*

Comparisons with the published record (cf. Hultén, Fl. Al. & Yuk; Spetzman; Wiggins and Thomas) suggest that at least 19 of our collections are significant contributions to present knowledge of plant distribution on the Arctic Slope of Alaska. These 19 significant records have been indicated in the catalog by prefixing the name of the species with an asterisk. Further comment and explanation can be found under each. It should be noted here, however, that of these 19 species *Braya siliquosa* apparently is a new record for North America, and the following four seem to be new to the Arctic Slope, although in several cases taxonomic opinion is involved, and the records prove less significant if a different taxonomic interpretation is espoused: *Draba bellii, Erigeron compositus, Primula sibirica, Salix stolonifera.*

ANNOTATED LIST

Equisetum variegatum Schleich. in Weber et Mohr ssp. **variegatum.** 3230*.

Alopecurus alpinus Sm. var. **alpinus.** 3156.

Arctagrostis latifolia (R. Br.) Griseb. s.l. 3237-A*, 3237-B, 3237-C*.

Tussocks of this grass were very abundant in a niggerhead meadow about 1 km. west of Sevenmile camp. Nine pieces from several tussocks were collected, and examination of these pieces revealed two rather distinct types and one more or less intermediate type. The first, 3237-A, represented by two pieces, has a relatively short culm, quite purple spikelets that are 4-6 mm long, and purple anthers averaging 2.5 mm long. These pieces would seem to match Hultén's typical *A. latifolia* (p. 144). The second, 3237-B, represented by six pieces, has a taller culm than A, spikelets that are less purple and 3.5-4.5 mm long, and yellow anthers mostly 1.5-2.0 mm long. Some of these anthers have purple tips, and on one piece they are distinctly longer than 2.0 mm. Perhaps these specimens belong to var. *arundinacea* (Trin.) Griseb., but the yellow anthers apparently are not typical for this variety. Porsild (1951, p. 82, under *A. arundinacea*) commented, "The anthers that in early anthesis are purple become yellow in age. . . ." Our specimens vary from preanthesis to immature fruit, but I find no evidence that anther color varies with age. Rather, the color difference seems constant with age, suggesting that it is genetic. The third, 3237-C, represented by one piece, is quite similar to A, but differs by having some yellow suffused in the purple anthers and by having less purple spikelets that are about 4 mm. long. In these latter characters it is more similar to B. All three types have rather congested and strict panicles and quite variable scabrosity on the pedicels. In general, the pedicels are sparsely if at all scabrous.

As Hultén commented (p. 147), this seems to be an extremely variable species in Alaska. Careful field study is needed to determine the validity of segregating several varieties within it. At Sevenmile, two rather distinct types are growing side-by-side, along with some apparent intermediates, suggesting hybridization.

Deschampsia caespitosa (L.) Beauv. ssp. **caespitosa** var. **glauca** (Hartm.) Sam. 3252.

Trisetum spicatum (L.) Richt. 3285.

Poa arctica R. Br. 3234*, 3269; verified by Porsild.

No. 3234 comprises one immature specimen, and the racial relationship could not be determined. No. 3269 represents ssp. *arctica.*

P. glauca Vahl. *3178*; verified by Porsild.

***P. komarovii** Roshew. *3325.*

Our specimens are not altogether typical of this species and suggest *P. lanata* Scribn. et Merr. somewhat. Both Porsild and Hultén have seen these specimens. Porsild expressed some doubt about my determination but without suggesting any other identity, while Hultén

concluded that my determination is probably correct. In favor of *P. komarovii* are the low habit (cf. Anderson, p. 77), general resemblance to *P. alpina* L., presence of many dried basal sheaths, and the short (less than 2 mm.) anthers. In favor of *P. lanata* are the very greenish-purple spikelets, relatively narrow leaves, and prominent lanatum on the lower part of the lemmas and on the keel and lateral nerves to above the middle. Possibly our specimens belong to some other Asiatic species, but for the present it seems best to refer them here.

Poa komarovii is an Amphi-beringian species, which in Alaska is distributed primarily in the Aleutians and on the islands in the Bering Sea. It is, in Hultén's opinion (1937, p. 39), a radiant from so-called "Southern Beringia." Previous records from the Arctic Slope are all from the general area of Point Barrow (Hultén, p. 212; Wiggins and Thomas, p. 364). Our specimens were collected very near the shore. It might be added here that more typical specimens of this species were collected by us also at Atkasuk along the Meade River southwest of Point Barrow. Porsild concurred fully with my determination of those specimens.

Apparently, this typically more southern species has invaded the Arctic Coastal Plain and migrated at least as far east as Point Barrow.

Arctophila fulva (Trin.) Anders. 3260.

Dupontia fischeri R. Br. ssp. **psilosantha** (Rupr.) Hult. 3290.

Festuca rubra L. s.l. 3214.

Bromus inermis Leyss. ssp. **pumpellianus** (Scribn.) Wagnon var. **arcticus** (Shear) Wagnon. (*B. pumpellianus* Scribn., incl. vars. *arcticus* (Shear) Porsild and *villosissimus* Hult.) 3215.

Our specimens, all collected on the same gravel bar, are extremely variable with respect to pubescence and seem to fit best the views of Wagnon (1950), regarding taxonomic treatment of plants of this affinity.

Eriophorum angustifolium Honck. ssp. **angustifolium.** 3265.

***E. brachyantherum** Trautv. 3199; det. by Hultén.

Apparently this is the second record for the Arctic Slope. Hultén (p. 279) did not report it, and Wiggins and Thomas (p. 91) assign only one collection to this species and "with some reluctance." They report a Spetzman collection from Lake Noluck, in the foothills of the Brooks Range about 200 km east of Cape Sabine, as this species.

E. scheuchzeri Hoppe. 3300.

E. vaginatum L. ssp. **vaginatum.** 3301.

The anthers of our specimens are 2.0-2.5 mm. long, most of the scales are not conspicuously darker in the center, and the spikes are more or less oblong (cf. Hultén's key, p. 275). This subspecies is unreported from the Arctic Slope, but is not unexpected in western Alaska. Subspecies *spissum* is the common North American race, whereas ssp. *vaginatum* is Eurasian.

Carex aquatilis Wahlenb. s.l. 3289.

Our specimens are intermediate between *C. aquatilis* and *C. stans* Drej., but approach *C. aquatilis* more closely (cf. key of Krechetovich, Fl. SSSR 3: 201-202, 1935). Hultén (pp. 339-340) included *C. stans* in *C. aquatilis*, but generalized that all specimens of the Arctic Coast belong to the *C. stans* type. The records of Wiggins and Thomas (p. 104) are in agreement with this generalization, but our collection would seem to be an exception.

C. atrofusca Schk. *3341*.

***C. krausei** Boeckeler ssp. **krausei.** 3250.

The strictly gynoecandrous condition of the terminal spikes immediately places this collection in *C. krausei*, according to Hultén (p. 348). But, according to the recent cytotaxonomic revision of *Carex Section Capillares* by Löve, Löve, and Raymond (pp. 744-745), the identity of our specimens is not so clearcut. Interesting as their study is from a biosystematic point of view, it also indicates the difficulties of achieving a practical taxonomic treatment that faithfully reflects underlying cytological differences. If one accepts the taxa that they have recognized in this group on cytological grounds, one is hard-pressed to distinguish them morphologically with their key. All characters used are highly variable, and the key is replete with numerous overlaps and relative distinctions. Despite what I would call "clavate-linear" terminal spikes that do overtop the lower ones and despite culms up to 20 cm. high, I think our specimens can only belong to *C. krausei* ssp. *krausei* as delimited by them. On the whole our plants are rather low — mostly 15 cm. or less.

Our record appears to extend the known range of this species considerably westward on the Arctic Slope (cf. Wiggins and Thomas, p. 112).

***C. lugens Holm.** 3238-A, 3238-B, 3238-C*, 3238-D*.

This species is unreported from the western sector of the Slope (cf. Wiggins and Thomas, p. 106).

C. membranacea Hook. *3155*, 3287.

C. physocarpa Presl. 3288.

Our specimens are not entirely typical. They have predominantly just one staminate spike, the perigynia are almost black, only some of the scales have hyaline tips, and the leaves are narrow, mostly 3 mm. wide or less.

C. rariflora (Wahlenb.) Smith. 3268.

C. scirpoidea Michx. 3249.

Juncus albescens (Lge.) Fern. (*J. triglumis* sensu Hultén, in part). 3204*.

J. balticus Willd. var. **alaskanus** (Hult.) Porsild. (*J. arcticus* Willd. ssp. *alaskanus* Hult.) 3209.

J. castaneus Smith s.l. *3157*, 3208.

Luzula confusa Lindb. 3224-A*.

L. tundricola Gorodk. (*L. nivalis* var. *latifolia* sensu Hult. Fl. Al. & Yuk., Wiggins and Thomas; cf. Hult., 1962, p. 10). *3179*, 3224-B; det. by Hultén.

***L. wahlenbergii** Rupr. 3267.

This essentially circumpolar species has been reported previously for the Arctic Slope only from Umiat (Spetzman, p. 43) and Chandler Lake (Wiggins and Thomas, p. 128).

Lloydia serotina (L.) Rchb. 3257.

Salix alaxensis (Anders.) Cov. var. **alaxensis.** *3340*; det. by Argus and Raup.

S. arctica Pall. 3282, *3330*; det. by Argus and Raup.

S. brachycarpa Nutt. ssp. **niphoclada** (Rydb.) Argus. (*S. niphoclada* Rydb.) 3302*; det. by Argus.

S. farrae Ball ssp. **walpolei** (Cov. et Ball) Hult. 3296; det. by Argus and Raup.

S. glauca L. s.l. 3256*, 3278, 3298; det. by Argus.

I have deferred here entirely to Dr. George Argus, who has just completed a revision of the *S. glauca* complex, and have made no attempt to evaluate our specimens according to Hultén's treatment. Argus believes that infraspecific taxa cannot be maintained meaningfully in this extremely variable species. He recognizes instead several "phases." He determined our collections as his so-called "Beringian Phase." (Personal conversation, Dec. 1960).

S. glauca × **S. brachycarpa** ssp. **niphoclada.** 3256-A*, det. by Argus.

S. phlebophylla Anders. 3223.

***S. polaris** Wahl. ssp. **pseudopolaris** (Flod.) Hult. 3222, 3276*, *3328*; det. by Hultén.

In my opinion these plants approach ssp. *polaris* more closely than ssp. *pseudopolaris.* Our collections extend the known range of *S. polaris* considerably westward on the Slope (cf. Wiggins and Thomas, p. 149).

S. reticulata L. 3275, *3329.*

S. richardsonii Hook. 3299*; det. by Raup.

***S. stolonifera** Cov. *3332*; det. by Argus and Raup.

This would appear to be a most significant record, since *S. stolonifera* is a species of the Pacific Coast of Alaska (Hultén, p. 523). The one previous record for the Arctic Slope (Raup, 1959, p. 52) is also from Cape Sabine, based on a specimen collected by Cantlon and Gillis and determined by Raup. Several other species of the *Ovalifolia* group are known from the Slope, however, and, since this group is much in need of study, I am inclined to doubt the significance of our record. I suspect that what Raup has here designated *S. stolonifera* may prove to be only a variant of some other species of the group common to the Arctic Slope.

Betula glandulosa Michx. var. **sibirica** (Ledeb.) Blake. (*B. nana* L. ssp. *exilis* (Sukatch.) Hult.) 3281.

American opinion (Porsild, 1951, p. 152; Wiggins and Thomas, p. 152) seems to favor regarding this taxon as a variety of *B. glandulosa*, while Hultén is convinced that it represents a race of the Eurasian *B. nana*. This question clearly needs careful study. Our specimens fit *B. exilis* quite well (cf. Kuzeneva, Fl. SSSR. 5: 271, 1936), and I find Hultén's view not without merit.

Rumex arcticus Trautv. 3196.

Polygonum bistorta L. ssp. **plumosum** (Small) Hult. 3244.

P. viviparum L. 3277*.

Stellaria longipes Goldie. 3236; det. by Hultén.

Cerastium beeringianum Cham. et Schlecht. 3286.

Arenaria arctica Stev. (*Minuartia arctica* (Stev.) Aschers. et Graebn.) *3175*, 3251, *3338*.

No. 3175 and 3338 approach *A. obtusiloba* (Rydb.) Fern. in habit and in length and ciliation of leaves. Unfortunately, none of the collections has seeds present, and this rather important character could not be checked.

A. rossii R. Br. (includ. *Minuartia elegans* sensu Hultén); *3180**, 3225, *3337*.

No. 3180 has the closely tufted habit and short pedicels of typical *A. rossii*, while nos. 3225 and 3337 have a much more diffuse habit and longer pedicels, resembling *M. elegans*, sensu Hultén (p. 681).

Silene acaulis L. var. **exscapa** (All.) DC. *3183*, 3233.

Melandrium apetalum (L.) Fenzl ssp. **arcticum** (Fr.) Hult. 3203, *3321*.

One specimen of 3203 has corolla limbs considerably exceeding the calyx and less emarginate than on the specimens with short limbs, but otherwise this specimen is similar to the others.

Caltha palustris L. var. **arctica** (R. Br.) Hutch. 3284.

Tolmatchev (1955, p. 149) regards this race as a good species, but the differences separating it from *C. palustris* are quantitative and tenuous. It is not clear to me why both Hultén (pp. 712-713) and Porsild (cf. 1955, pp. 113-114, and 1957, p. 180, map 157) treat this taxon as a variety nomenclaturally when they seem to be of the firm opinion that it is a geographic race.

Delphinium brachycentrum Ledeb. 3187*.

Aconitum delphinifolium DC. ssp. **paradoxum** (Rchb.) Hult. *3169*.

Anemone narcissiflora L. s.l. 3226.

Hultén (pp. 732-736) and Wiggins and Thomas (pp. 186-187) distinguish subspecies in this species, but I incline to the position of Porsild (1951, pp. 177-178) and Raup (1947, p. 178) that this variable species is best regarded in the broad sense. Our plants fit ssp. *sibirica* (L.) Hult., as would be expected on geographic grounds, but I find, as Porsild does, that the distinction between this subspecies and ssp. *interior* Hult. is indeed tenuous.

A. parviflora Michx. 3229*, 3242.

Ranunculus nivalis L. 3228.

R. pallasii Schlecht. 3259.
R. sulphureus Sol. *3313**.
Papaver macounii Greene. 3291, *3316-B**.
P. radicatum Rottb. s.l. (includ. *P. alaskanum* Hult.) *3316-A*.

These specimens seem to fit Hultén's segregate species *P. alaskanum*.
Corydalis pauciflora (Steph.) Pers. *3168*.
Cochlearia officinalis L. ssp. **arctica** (Schlecht.) Hult. *3173*.
Cardamine digitata Richards. (*C. richardsonii* Hult.) 3254.

Contrary to Hultén (p. 838), there is no earlier homonym of this binomial (cf. Shetler, 1961).
***Draba bellii** Holm. (possibly *D. macrocarpa* sensu Hultén — cf. his remarks regarding *D. bellii*, p. 868) ; 3202; det. by Porsild.

Neither Spetzman nor Wiggins and Thomas reports this species from the Arctic Slope, but the systematics of arctic *Draba* are so complex that one hesitates to attribute any great phytogeographical significance to this segregate species of the *D. alpina* L. complex. I have deferred here to Porsild, however, whose wide experience with this genus in the Arctic convinces him that plants exhibiting the characteristics of our specimens should be distinguished as the separate species *D. bellii*. If our plants are placed in *D. alpina* s.l., then our record loses significance.
D. lactea Adams. *3172-A;* verif. by Porsild.
D. longipes Raup. *3170, 3172-B**; verif. by Porsild.
D. nivalis Liljebl. var. **nivalis.** 3327*; verif. by Porsild.
D. pilosa Adams ex DC. 3191*; det. by Porsild.
Smelowskia calycina (Steph.) C. A. Mey. ssp. **integrifolia** (Seemann) Hult. *3150, 3326*.
Erysimum pallasii (Pursh) Fern. *3148*.
***Braya siliquosa** Bunge. 3201; det. by Porsild.

Although the taxonomic situation in this genus is very complex, Porsild believes (letter, Dec. 1960) that our plants can only belong to *B. siliquosa*, a small Asiatic species which apparently is unknown to North America. This species is distinguished from other Eurasian species by its narrow linear siliques, 10-15 mm. long by about 1 mm. wide (cf. Vassilczenko, Fl. SSSR 8: 70-71, 1939). The siliques of our specimens have a maximum length of 10 mm. and a width of about 1 mm. These dimensions fit *B. siliquosa*, although the siliques are on the short side. The Cape Sabine record represents a most remarkable range extension. According to Vassilczenko, this species is widespread in Asia from western Siberia (Altai) to eastern Siberia and Okhotsk in the Far East, and it inhabits alpine meadows and slopes. He also reported that it is found in North America from 52°-57° N. lat., but I have found no American confirmation of this. Popov (*1:* 545-546) called it an alpine zone species of certain parts of the Sayan Mountain forest region and considered that it radiated westward from alpine areas of the Okhotsk region. Hultén (1937, pp. 16-17, pl. 3) regarded it as a boreal Eurasiatic species that has radiated from the Amur

region and is widely distributed in central and eastern Asia, but has not reached either Europe or extreme northeastern Siberia. That *B. siliquosa* is a *boreal*, not arctic, species in Asia makes the Cape Sabine record all the more significant. Our plants were collected on a sandflat along the Pitmegea River at Sevenmile, the site more definitely in foothills topography, and quite possibly this species has only recently "washed down" from alpine areas in the Brooks Range. It should also be noted, however, that Cape Sabine lies in a general area that has not been glaciated and presumably, therefore, has served as an important refugium for plants during the Pleistocene. Perhaps prior to Pleistocene glaciation, *B. siliquosa* was more widespread in Alaska.

Parrya nudicaulis (L.) Regel s.l. 3255, *3320*.

No. 3320 fits Hultén's ssp. *interior*, but 3255 is so variable in the width and toothing of the leaves as to defy racial identity. My own limited experience with this variable species leads me to question Hultén's races.

Saxifraga bronchialis L. ssp. **funstoni** (Small) Hult. *3160*.

S. cernua L. 3195*, 3263.

S. davurica Willd. ssp. **grandipetala** (Engler et Irmscher) Hult. 3280, *3310*.

S. eschscholtzii Sternb. *3182*.

S. flagellaris Willd. ex Sternb. ssp. **flagellaris.** 3219, *3323*.

Phytogeographically, our plants should belong to this subspecies, although morphologically they tend toward ssp. *platysepala* (Trautv.) Pors. (cf. Porsild, 1955, pp. 136-138).

S. foliolosa R. Br. 3264.

S. hieracifolia Waldst. et Kit. var. **rufopilosa** Hult. 3270.

S. hirculus L. 3189.

S. oppositifolia L. 3198, *3307**, *3336**.

S. punctata L. ssp. **nelsoniana** (D. Don) Hult. 3193, *3311*.

Chrysosplenium tetrandrum (Lund) Th. Fries. 3194*.

C. wrightii Franch. et Sav. *3342*.

Parnassia kotzebuei Cham. et Schlecht. 3211.

Rubus chamaemorus L. 3190.

Potentilla biflora Willd. ex Schlecht. 3186, 3232.

P. hyparctica Malte. (*P. emarginata* Pursh s.l.); 3231*; verif. by Porsild.

P. ledebouriana Porsild. (*P. uniflora* Ledeb.); *3319*; det. by Porsild.

P. palustris (L.) Scop. 3266.

Dryas integrifolia M. Vahl. *3177**, 3253, *3331**; det. by Porsild.

D. octopetala L. *3176*, 3221; det. by Porsild.

No. 3176 is a very silvery canescent form designated by Porsild as "f. *canescens-argentea*."

D. integrifolia × **octopetala.** 3283-A*; det. by Porsild.

Lupinus arcticus S. Wats. 3218, *3317**.

Astragalus alpinus L. s.l. 3279, *3335*.

Our plants seem to fit what Hultén (pp. 1081-1085) called the "main type," but the question of races in this species needs further study.

*__A. polaris__ Seemann in Benth. 3274, *3339*; det. by Porsild.

This attractive little *Astragalus* species is an Alaskan endemic of gravel bars, known only from a few widely scattered localities. Wiggins and Thomas cite only one specimen from the Arctic Slope (Utukok R., cf. W. and T., p. 263).

A. umbellatus Bunge. 3206, *3312*.

Oxytropis leucantha sensu Hultén. 3239; det. by Porsild.

Porsild annotated this collection as follows: "This is *Oxytropis leucantha* sensu Hult. Fl. Al. & Yuk. not Pall. It is close to *O. glutinosa* Pors. but differs in several characters nor is it *O. viscida* or *O. viscidula.* It is probably an undescribed species of which I have other collections from W. Alaska [Dec. 1960]."

O. nigrescens (Pall.) Fisch. *3184*, *3185*, 3205*, *3324*; det. by Porsild.

Our collections exhibit several rather distinct types. Nos. 3184 and 3205 are very pulvinate and gray-pilose and seem to fit Hultén's ssp. *pygmaea* (cf. Hultén, pp. 1102-1105) fairly well, whereas no. 3185 is not particularly pulvinate and is less gray-pilose. No. 3324 includes plants of both types. The less pulvinate plants approach ssp. *bryophila* (Greene) Hult.

Hedysarum alpinum L. ssp. **americanum** (Michx.) Fedtsch. 3294.

H. mackenzii Richards. 3295, *3334*.

Epilobium latifolium L. 3304.

Hippuris vulgaris L. 3258

Bupleurum americanum Coult. et Rose. *3146*.

These plants are very low, in some cases almost acaulescent, and have relatively few rays (3-6) per umbel. Leaf-width however is quite variable. The cauline leaves mostly are narrowly lanceolate or linear, but they range up to nearly a centimeter in width and in some cases are distinctly clasping at the base. Thus in general habit they are strikingly different from the large plants of Interior Alaska, and there is no doubt that they are closely related to the Asiatic *B. triradiatum* Adams ex Hoffm. Quite possibly they should be referred to ssp. *arcticum* (Regel et Tiling) Hult. of the latter species, but until a comprehensive study of the Alaskan forms is available, including extensive comparisons with Asiatic material, it seems best to follow Hultén (pp. 1166-1168) in relegating this dwarf arctic form to the endemic American species, *B. americanum* (cf. also, Hult. Fl. Kamtch., pp. 157-158; Lincheviskii, Fl. SSSR *16:* 301-303, 1950).

Conioselinum cnidiifolium (Trucz.) Pors. *3143*.

The relationship of this species to the Asiatic *C. vaginatum* (Spreng.) Thell. s.l. needs careful scrutiny. Although *C. cnidiifolium* is reported to occur in eastern Asia (Hultén, p. 1177; Polunin, 1959, p. 328), Schischkin makes no mention of it in *Flora SSSR* (*17:* 1-10,

1951). Apparently, he referred all material of this affinity to *C. vaginatum*.

Pyrola grandiflora Radius. 3271*.

Ledum palustre L. ssp. **decumbens** (Ait.) Hult. 3273.

Cassiope tetragona (L.) D. Don. 3217, *3322**.

***Primula borealis** Duby var. **borealis.** 3171.

This Amphi-beringian species, apparently restricted to the Arctic seashores (cf. Wiggins and Thomas, p. 295), was collected on a moist turfy slope right on shore at Cape Sabine. Although rare on the Arctic Slope, its occurrence here is not unexpected, since it has been collected before on the coastal plain northeast of Cape Sabine and at Cape Lisburne to the west.

***P. egaliksensis** Wormskj. 3200.

According to Wiggins and Thomas (p. 296), this species is "rare in the foothills of the Brooks Range and on the Coastal Plain."

***P. sibirica** Jacq. 3207*.

This Eurasian species has a very disjunct range in Alaska and Yukon, and is previously unreported north of the Brooks Range. According to Hultén (1937, p. 92), it is an "Arctic-montane" radiant from eastern Asia.

***P. tschuktschorum** Kjellm. *3152*.

Although known from a widespread group of localities south of the Brooks Range, the only previously known locality north of the Range was Cape Lisburne (cf. Wiggins and Thomas, p. 295).

Androsace chamaejasme Host. ssp. **lehmanniana** (Spreng.) Hult. 3241, *3315*.

Dodecatheon frigidum Cham. et Schlecht. *3153*, 3305.

Phlox sibirica L. ssp. **borealis** *(Wherry) stat. et comb. nov. (P. borealis* Wherry, *The Genus Phlox*, p. 126, 1955; P. sibirica sensu Hult.) *3149*.

In Wherry's opinion (op. cit.), Alaskan plants of the affinity of *P. sibirica* L. should be segregated into a separate taxon because they differ consistently from Asiatic plants of this species in being "smaller in stature and in sizes of parts." He proposed to call the Alaskan taxon a distinct species, *P. borealis* Wherry. While he seems to have a good case for segregating the Alaskan plants, the differences he cites are all variable and quantitative, and it seems best to regard these plants as nothing more than a geographical race of *P. sibirica* L.

Polemonium acutiflorum Willd. in Roem. et Schult. 3235.

Myosotis alpestris F. W. Schmidt ssp. **asiatica** Vestergr. in Hult. *3147*.

Lagotis glauca Gaertn. s.l. 3188*.

In the absence of a convincing statistical demonstration of the validity of var. *stelleri* (Cham. et Schlecht.) Trautv. (cf. Hultén, Fl. Kamtch. *4:* 103-105, 1930), I am inclined to consider *L. glauca* broadly, even though both Hultén (pp. 1384-1385) and Wiggins and Thomas (p. 307) refer all Arctic Slope plants to this variety. The question is

further complicated by the problem of *L. minor* (Willd.) Standley (cf. Vikulova, Fl. SSSR *22:* 501, 1955). Whether it is still a third closely related taxon or simply the oldest name for var. *stelleri*, as suggested by Vikulova's synonymy, can only be resolved by comparing Eurasian and American specimens statistically.

Castilleja pallida (L.) Spreng. s.l. 3216, *3333*.

According to Pennell's key (p. 522), our specimens belong to the typical subspecies, ssp. *pallida* (ssp. *typica* of Pennell). Phytogeographically, however, they should belong to ssp. *caudata* Pennell, and Hultén has determined our 3216 as this subspecies. In point of fact, the distinctions drawn by Pennell between these two subspecies are questionable (cf. Hultén, pp. 1391-1392), and I refrain for the present from recognizing them.

Pedicularis capitata Adams. *3181**, 3306.

P. **langsdorfii** Fisch. ex Steven. s.s. (exclud. *P. arctica* R. Br.) 3220*, *3318**.

***P. oederi** Vahl. 3240*.

This species appears to be very rare on the Arctic Slope, although south of the Brooks Range it is rather widespread and reasonably common (cf. Hultén, map 1056, p. 1472). Spetzman (p. 49) records it only from Anaktuvuk Pass. Wiggins and Thomas (pp. 309-314), curiously, make no mention of this species, although the specimen on which they based the presence of *P. flammea* L. on the Slope was Spetzman's no. 1747, which he determined as *P. oederi*. This is undoubtedly the specimen on which Spetzman based his Arctic Slope record, because it is from Anaktuvuk Pass. I have examined this collection (1747) at the U. S. National Herbarium and have compared it with both *P. flammea* and *P. oederi*. It does fall somewhat on the low side of the size range for *P. oederi*, giving some room for doubt perhaps, but there is no question but that it is this species and not *P. flammea*, as Wiggins and Thomas decided (p. 314), albeit with some doubt. This means that *P. flammea* should be removed from their list of species for the Arctic Slope, and *P. oederi* should be added.

***P. pennellii** Hult. 3261.

Not previously recorded this far west on the Arctic Slope (cf. Wiggins and Thomas, p. 311).

P. **sudetica** Willd. ssp. **albolabiata** Hult. (cf. Hultén, 1961); *3164*; det. by Hultén.

P. **sudetica** ssp. **pacifica** Hult. (cf. Hultén, 1961); 3212; det. by Hultén.

P. **verticillata** L. 3262*.

Valeriana capitata Pall. ex Link. *3166*, 3192.

Campanula uniflora L. *3154*, *3158**, *3167*, *3174*.

Blue and white-flowered forms seemed to be equally common and to occur intermixed in the populations.

Solidago multiradiata Ait. 3308*.

Aster sibiricus L. s.l. (includ. *A. subintegerrimus* (Trautv.) Ostenf. et

Resvoll, and *A. richardsonii* Spreng.; cf. Tamamshan, Fl. SSSR *25:* 77-110, 1959, and Hultén, pp. 1493-1496). 3210.

***Erigeron compositus** Pursh var. **glabratus** Macoun. *3144*.

This is the first record of the species for the Arctic Slope and represents a very significant range extension northwestward.

Chrysanthemum integrifolium Richards. 3293.

Artemisia arctica Less. (*A. norvegica* ssp. *saxatilis* (Bess.) Hall et Clements, Wiggins and Thomas, p. 341). *3165*, 3303.

***A. richardsoniana** Bess. (*A. borealis* sensu Hultén, in part: cf. Fl. Al. & Yuk., p. 1556, under *A. aleutica* Hult.; cf. also, Porsild, 1955, pp. 185-186;? *A. trifurcata* Steph. ex Spreng., Wiggins and Thomas, p. 340.) 3297; det. by Porsild.

Porsild (loc. cit) segregates this species from the circumpolar *A. borealis* Pall. as an endemic of the Canadian Arctic Archipelago, while Hultén (loc. cit.) and Polunin (1959, p. 430) unite these two species under *A. borealis*. Our collection represents a significant range extension only if the interpretation of Porsild is accepted. Owing to the absence of discussions and to the minimal synonymy in Wiggins' and Thomas' treatment, I am hard-pressed to relate it to the treatments of Porsild and Hultén.

Petasites frigidus (L.) Fries. 3227.

Arnica louiseana Farr ssp. **frigida** (Meyer ex Iljin) Maguire. *3162*, 3247.

Senecio atropurpureus (Ledeb.) Fedtsch. ssp. **frigidus** (Richards.) Hult. *3161*, 3197*, 3272, *3309*.

No. 3309 approaches ssp. *atropurpureus*.

S. fuscatus (Jord. et Fourr.) Hayek. *3159**.

S. hyperborealis Greenm. *3145*.

It seems to me highly doubtful that this species is really distinct from *S. conterminus* Greenm. and/or *S. resedifolius* Less. Polunin (1959), p 460) unites it with the latter species, a relatively widespread species on the Arctic Slope, although Hultén, Porsild, and Wiggins and Thomas maintain it.

S. lugens Richards. *3163*, 3245.

S. resedifolius Less. 3246.

Saussurea angustifolia (Willd.) DC. 3292*.

***Taraxacum phymatocarpum** J. Vahl. (*T. lyratum* (Led.) DC., in part, Wiggins and Thomas, p. 353); *3151**, 3243; det. by Porsild.

From the specimen citations it appears that Wiggins and Thomas referred all specimens of this species to *T. lyratum*, although this is made clear neither by discussion nor synonymy. I am not able to compare our specimens against their key at present and think it best to accept Porsild's determination. Whether or not our record from Cape Sabine is phytogeographically significant depends entirely upon one's taxonomic view of the complex of forms relegated to *T. lyratum*. If one segregates the apparently New World *T. phymatocarpum* from

it, then our record is reasonably significant. Only one previously published report for the Arctic Slope appears to exist (Spetzman, p. 51).
Crepis nana Richards. 3213*.

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